

XIX. *An Account of some Thermometrical Observations, made by Sir Robert Barker, F. R. S. at Allahabad in the East Indies, in Lat. 25° 30' N. during the Year 1767, and also during a Voyage from Madras to England, in the Year 1774. Extracted from the original Journal by the Hon. Henry Cavendish, F. R. S.*

Redde, April 6, 1775. THE greatest part of the observations at Allahabad were made within doors; several were made within a tent placed under the shade of trees, some in the open air in the Sun, and some in the open air in the shade; but there is no regular series of observations in any one place; nor were they made at stated times of the day. Though a thermometer kept within doors is but a very indifferent measure of the heat of any climate; yet as I have not seen any thermometrical observations made in that country, except a few during the heats of the summer, and printed in the Philosophical Transactions, vol. LVII. page 218. I have set down the great and least heights I meet with in each month.

January

	Leaft.	Greatest.		Leaft.	Greatest.
January	58	72	July	81	90
February	60	84	August	80	86
March	62	94	September	78	83
April	79	96	October	72	87
May	72	101	November	52	86
June	81	99	December	51	64

From the 3d of May to the 4th of June inclusive, a thermometer placed within a tent, under the shade of trees, was almost every day above 100° , and several times above 109° , once at 112° . The trees under which the tent was placed formed, as I have been informed, a very thick shade; so that I think these heights are more likely to fall short of the true heat of the open air at that time, than to exceed it. The least height I meet with of the thermometer in the open air in the shade, is 42° ; which it was at twice in the month of January, at 7 A.M. The greatest heat is on June 9th, at noon, when it was at 114° , the sky cloudy; the thermometer within doors at the same time 95° , which is less than it had frequently been in the month of May; so that it seems likely, that the heat in the open air in May had frequently been above 114° . During the voyage to England, the thermometer was placed in the round-house, and was observed regularly at eight in the morning, at noon, and at three in the afternoon; the winds and weather are also set down. The round-house, I have

I have been informed, is one of the uppermost row of cabbins, and is reckoned the coolest and most airy part of the ship. From February 13. to April 7. between Madras and the Southern tropic, the thermometer was constantly between 77° and 86° , and very seldom lower than 80° . From thence to April 23, lat. $34^{\circ} 12'$, about 15° E. of the Cape of Good Hope, between 70° and 80° . From thence to May 20, at St. Helena, between 62° and 72° . Thence to August 2. in lat. $43^{\circ} 14'$ N. between 71° and 80° ; and from thence to August 15, in the British Channel, between 62° and 70° . At land it is well known, that the heat is usually considerably greater in the middle of the day than in the morning or night; but it appears from these observations, that in the open sea, there is scarce any sensible difference; for in settled weather, the difference between the different times of the day was rarely more than 1° , oftener none at all. In unsettled weather there was frequently a difference of 2° , sometimes 4° , scarce ever more; but then there seems no connexion between this difference and the time of the day, it being as often colder in the middle of the day than in the morning or evening, as warmer. There is added a register of the thermometer, in the soldiers barracks at Allahabad, on June 8, 1769, when from 10 in the morning to 8 in the afternoon it stood constantly above 100° , in the hottest part of the day at 107° , and during the whole night between 99° and 98° .

Sir Robert Barker, at my request, has been so good as to add the following account of the general state of the weather in Bengal.

THE rains at Bengal generally set in between the 11th and 15th of June, and continue till the middle of October, when it remains fair till February, the wind blowing mostly from the N.E. quarter, in which month and March it is interrupted by the N.W. squalls, attended with violent gusts of wind, thunder, and lightning, with short, but excessive hard, showers of rain or hail, commonly one, but rarely two, in each day. From the middle of March to the middle of June the weather is very hot. At Allahabad and the upper country the rains are not expected till the 20th of June, and seldom exceed the 30th, excepting in extraordinary seasons, when it has been known to keep off till the 5th of July; but such an event is usually attended with a great mortality both of men and beasts. They break up about the middle of September, and from this time to the beginning of January it continues fair cold weather. In January there are, almost always, a few days rain, seldom more than a week, and that gentle and pleasant, which is productive of a second crop, which they usually reap. The winds at Allahabad set in Easterly from the beginning of the rains, and blow almost constantly from that quarter until the conclusion of the cold weather in March, when it changes more Northerly, and is attended by violent North-west squalls of thunder, lightning, rain, and hail, at which time it changes to the West, blowing with violence, and a heat which frequently destroys the birds and beasts in the fields, till the rains afford a relief.

lief. The river Ganges begins to swell before the commencement of the rains, reported by the natives to proceed from the melting of the snow on the Northern mountains during the heats of May and June. But the sudden rise of the waters in the Ganges, a few days after the setting in of the rains, is almost incredible; since it has been known to rise twenty feet in forty-eight hours; and its sudden fall is as extraordinary. In Bengal the rivers are of course affected by the rise and fall of the Ganges. Floods continue the whole time of the rains, more or less; but the greatest overflowings are generally at the beginning and the end or the breaking up of the rains, at which period it rains with the greatest violence. The waters at Allahabad and in all the upper countries run off into the rivers as soon as the rain has ceased, the soil being for the most part of sand, and the country intersected with small rivulets; but in Bengal, and particularly so low down as Calcutta, being of a clay soil and an extensive flat, the whole country is overflowed, forming lakes of great extent, some of them being six miles over. The water, therefore, generally remains till the Sun has exhaled it, by which it becomes putrid, and renders those parts extremely unwholesome, occasioning those deadly putrid fevers, which carries off the patient in a few hours, known by the name of *pucker fevers*.